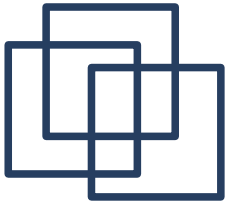# BOINC:FAST
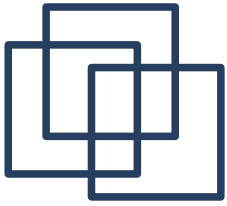
Evgeny Ivashko
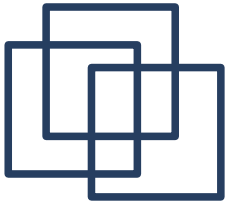
Contents

- BOINC:FAST'2013 – a review of topics
- BOINC:FAST'2015 – plans

BOINC:FAST'2013

What is BOINC:FAST?

means *„**BOINC**-based high-performance computing: **F**undamental and **A**pplied **S**cience for **T**echnology"*

BOINC:FAST was the first conference in Russia to address BOINC technologies, modelling and applications.

The first conference was held in Petrozavodsk, Russia in 2013.

The second conference will be held in Petrozavodsk, Russia in 2015
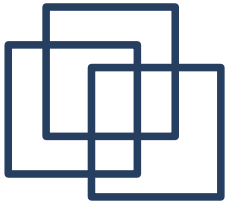
http://boincfast.ru
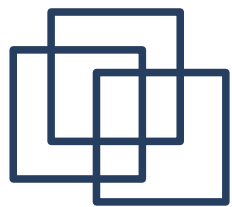
09 – 13 September,
Petrozavodsk,
shore of Onego lake

Results:

- 17 reports, 25 participants (including D. Anderson and R. Lovas!)
- meeting of the International Desktop Grid Federation (Russian chapter)
- supported by NVIDIA, journal „Supercomputers"
- articles in „Supercomputers", „Troicky variant – Science"
- meeting with crunchers' representative

Key talks

David Anderson
   «Recent achievements in the BOINC-related area»
   (see video at www.boinc.fast.ru/en/program.html)

Robert Lovas
   «International Desktop Grid Federation: activities and
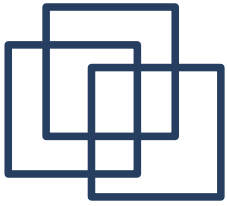benefits» (see video at www.boinc.fast.ru/en/program.html)

Mikhail Posypkin, «Centre for grid technologies of the Institute for Information Transmission Problems of the Russian Academy of Sciences»

Kolpakov R., Posypkin M., Hrapov N., «Research of periodic structures in arbitrary symbol sequences using Desktop Grids» (nkhrapov@gmail.com)

A problem in the domain of discrete mathematics. The results are used to construct data compressing and search algorithms, analysis of DNA etc.

Let $w = w[1]w[2]....w[n]$ be an arbitrary symbol sequence (word) of length n. Part of the word $w[j...j]=w[i]....w[j]$, $1 \leq i \leq j \leq n$ is a factor. $p>0$ is a period of word w if there is i such that $w[i]= w[i+p]$ for $i = 1, ... , n - p$.
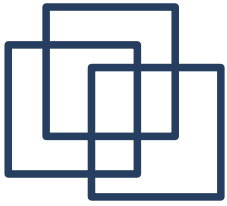
The research was conducted using the infrastracture of OPTIMA@HOME project.

Technologies

Tian Bo, «BNBTest – a BOINC-implementation of branch-and-bounds method» (yesyestian@gmail.com)

Branch-and-bounds method is popular in optimization problems. But it is hard to implement it in Desktop Grid environment. The work is a try to do it.
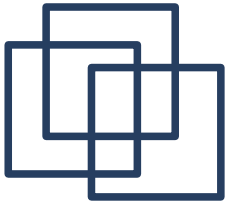
BOINC-based applications

Ilya Chernov, «Numerical solution of global identification of a dehydration model: Experience of using a BOINC-based Grid» (chernov@krc.karelia.ru)

Conducting a large number of numerical experiments for search of all local extremums for a dehydration model. The GenWrapper was used to execute the application.

Kurochkin Ilya, «Netmax BOINC project for modelling of telecommunication networks»

NETMAX project models telecommunication system as a graph and evaluates its connectivity, reliability, workload and other characteristics.
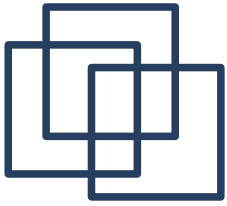
Enterprise Desktop Grid

<u>Evgeny Ivashko</u>, «Enterprise Desktop Grid»
(ivashko@krc.karelia.ru)

> Enterprise Desktop Grid is a Desktop Grid that consists of a number of computers belonging to the same organization and connected by a local network. This gives additional benefits such as greater bandwidth, manageability, trusted nodes and so on. Therefore the class of problems that can be solved by EDG in time is much wider than in a volunteer DG.

<u>Alexander Golovin, Evgeny Ivashko,</u> «BOINC-based Data Mining»
(ivashko@krc.karelia.ru)

> Association rules extraction from large transactional databases based on Enterprise BOINC-grid. A BOINC application is developed, experiments are performed (for databases up to 100 Gb).
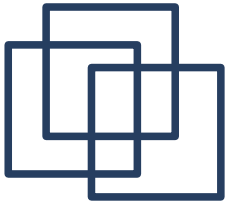
Mathematical modelling

<u>Alexander Rumiantsev</u>, «Reducing the makespan of an application in a Desktop Grid» (ar0@krc.karelia.ru)

> The mathematical model allows to evaluate the necessary level of replication for a BOINC-project based on known probability of errors on the client's side.

<u>Natalia Nikitina</u>, «Mathematical models for task management in BOINC» (nikitina@krc.karelia.ru)

> Several mathematical models aimed to reduce the runtime of tasks (increase the performance/efficiency) in a BOINC-project basing on special task management algorithms.

<u>M. Manzyuk, Oleg Zaikin,</u> «CluBORun: a tool to use a computing cluster in BOINC-based projects»

> A special tool to include a computing cluster in BOINC-projects.

<u>Alexey Chuharev, Alexander Rumiantsev,</u> «Infrastructure for BOINC-related research» (chuharev@krc.karelia.ru)

> A special set of virtual computers, which allow to quickly and easily construct a BOINC-grid (BOINC server and clients).
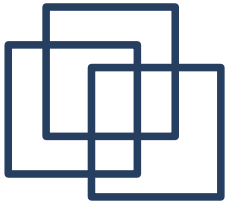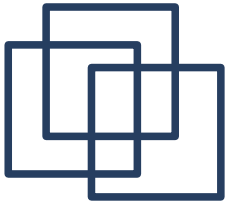
<u>Oleg Zaikin</u> (zaikin.icc@gmail.com),
«Search for orthogonal latin squares by volunteer project SAT@home»

«Developing a GPU software for SAT@home»

Latin square is an $n \times n$ array filled with n different symbols, each occurring exactly once in each row and exactly once in each column. Two latin squares A and B are orthogonal if (a[i,j],b[i,j])!=(a[k,m],b[k,m]) for any pair (i!=k, j!=m).The project SAT@home aims at searching three latin squares with size n=10 orthogonal in pairs. The problem has applications in combinatorics, cryptographics and bioinformatics. A GPU application was developed.
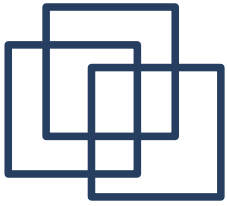
BOINC:FAST'2015
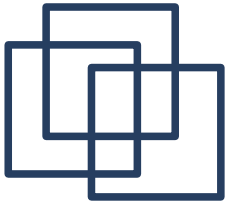
Key dates

BOINC:FAST – BOINC-based high-peformance computing: Fundamental and Applied Science for Technology

14 – 18 September 2015

Petrozavodsk, Russia

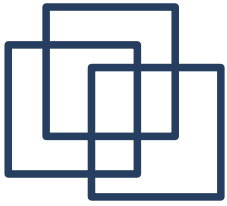First information letter and deadlines: available soon...

Aims and topics of BOINC:FAST'2015

Aims

- share experience and present recent achievements in BOINC-related research and technologies
- popularization of volunteer computing, Desktop Grids, BOINC
- collaboration

Topics

- BOINC, technologies related to BOINC
- mathematical modelling of BOINC and its workflows
- new applications for BOINC and BOINC projects
- recent results and statistics of existing BOINC projects
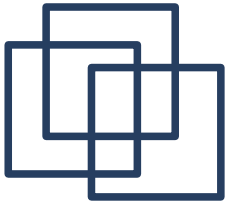- GPU applications in BOINC projects

Organizers

Organizers

- U. C. Berkley
- MTA SZTAKI
- Institute of Applied Mathematical Research of Karelian Research Centre of the RAS
- Institute for Information Transmission problems of the RAS
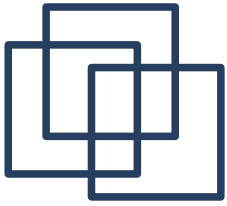
David Anderson

Peter Kacsuk, Robert Lovas

Evgeny Ivashko

Mikhail Posypkin

Publications

- Publishing materials of the conference in Springer, the Communications in Computer and Information Science series

- Selected papers will be published in a special issue of the Journal of Grid Computing

Additional benefits

Interesting and useful meetings:

- meeting of the International Desktop Grid Federation (Russian chapter)
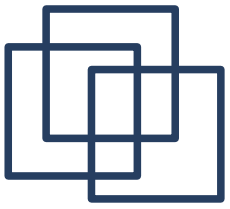- meeting with crunchers

Popularization of Desktop Grids:

- support by NVIDIA, journal „Supercomputers", others
- publishing articles in journal „Supercomputers", newspaper „Troicky variant – Science"

BOINC:FAST as the place for BOINC Workshop'2015?

- Petrozavodsk is the capital of Republic of Karelia, Russia
- Beatiful city on the shore of Onego lake.
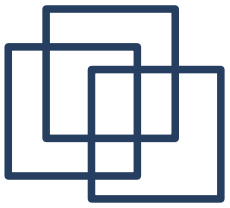- Not far from Moscow, Saint-Petersburg and Helsinki

Republic of Karelia is a wonderful place with a lot of sights

Waterfall Kivach – the largest one in Europe (among plain waterfalls)

Sightseeing
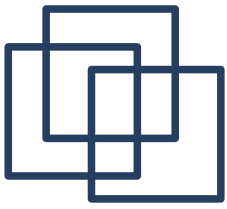
Kizhi island features a number of wooden structures such as boats, fish-houses, homes, saunas, windmills and chapels.
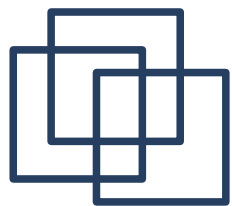
Beautiful nature
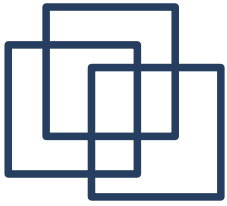
http://boincfast.ru

14-18 September, 2015
Petrozavodsk,
shore of Onego lake

Plans:

- >30 reports, >50 participants
- meeting of the International Desktop Grid Federation
- support by NVIDIA, journal „Supercomputers", others
- articles in „Supercomputers", „Troicky variant – Science"
- publishing articles in Proc. by Springer
- meeting with crunchers

To get the information letter, please provide me with your emails!

Institute of Applied Mathematical Research, KRC of RAS

The next year BOINC:FAST will be the best place to present your advance in BOINC

See you at

BOINC:FAST'2015!

To get the information letter, please provide me with your emails!